

Appl. No. New
Preliminary Amendment

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1-8. (Canceled)

Claim 9. (New) A method of conducting magnetic refrigeration, comprising:

applying a cyclic magnetic field change to a magnetic material serving as a working substance, wherein said magnetic material exhibits, in only a part of the temperature region from 200° K to 350° K, an inflection point at which the sign of the second derivative of magnetization with respect to an applied magnetic field changes from positive to negative, within the range of the strength of the magnetic field of not more than 1 tesla.

Claim 10. (New) The method according to Claim 9, wherein the magnetic material consists essentially of:

a total of 60 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr; and

a total of 4 to 40 atomic % of one or not less than two elements selected from the group consisting of Sc, Ti, Y, Zr, Nb, Mo, Hf, Ta and W.

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Claim 11. (New) The method according to Claim 10, wherein said magnetic material consists essentially of:

a total of 60 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 40 atomic % of one or not less than two elements selected from the group consisting of Sc, Ti, Y, Zr, Nb, Mo, Hf, Ta and W; and

a total of not less than 25 atomic % of one or not less than two elements selected from the group consisting of Ti, Zr, Nb and Hf.

Claim 12. (New) The method according to Claim 9, wherein said magnetic material consists essentially of:

a total of 50 to 80 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr; and

a total of 20 to 50 atomic % of one or not less than two elements selected from the group consisting of Sb, Bi, P and As.

Claim 13. (New) The method according to Claim 10, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 14. (New) The method according to Claim 11, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 15. (New) The method according to Claim 12, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 16. (New) The method according to Claim 9, wherein said magnetic material consists essentially of:

a total of 79 to 90 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 13 atomic % of one or not less than two elements selected from the group consisting of Si, C, Ge, Al, B, Ga and In; and

a total of 6 to 8 atomic % of one or not less than two elements selected from the group consisting of Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb, wherein the content of Si in the magnetic material is more than 4 atomic %.

Claim 17. (New) The method according to Claim 9, wherein a ferromagnetic/antiferromagnetic interaction occurs at said inflection point.

Claim 18. (New) The method according to Claim 9, wherein, in a graph of entropy change $\Delta S(T, \Delta H)$ versus temperature of the magnetic material which produces a peak, the effective temperature width of the peak must be 3° K or more.

Claim 19. (New) The method according to Claim 18, wherein the effective temperature width of the peak must be 5° K or more.

Claim 20. (New) The method according to Claim 9, wherein said magnetic material consists essentially of:

a total of 50 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 43 atomic % of one or not less than two elements selected from the group consisting of Si, C, Ge, Al, B, Ga and In; and

a total of 4 to 20 atomic % of one or not less than two elements selected from the group consisting of Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb, the magnetic material, at its inflection point within said temperature range, exhibiting a base width of at least 3° K of its peak of entropy change $\Delta S(T, \Delta H)$.

Claim 21. (New) An apparatus for performing magnetic refrigeration, comprising:

a magnetic material packed into a magnetic refrigeration chamber and a permanent magnet placed near the magnetic refrigeration chamber, whereby in operation the magnetic material, serving as a working substance, is subjected to a cyclic magnetic-field change, and

wherein said magnetic material exhibits, in only a part of the temperature region from 200° K to 350° K, an inflection point at which the sign of the second derivative of magnetization with respect to an applied magnetic field changes from positive to negative, within the range of the strength of the magnetic field of not more than 1 tesla.

Claim 22. (New) The apparatus according to Claim 21, wherein the magnetic material consists essentially of:

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a total of 60 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr; and

a total of 4 to 40 atomic % of one or not less than two elements selected from the group consisting of Sc, Ti, Y, Zr, Nb, Mo, Hf, Ta and W.

Claim 23. (New) The apparatus according to Claim 22, wherein said magnetic material consists essentially of:

a total of 60 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 40 atomic % of one or not less than two elements selected from the group consisting of Sc, Ti, Y, Zr, Nb, Mo, Hf, Ta and W; and

a total of not less than 25 atomic % of one or not less than two elements selected from the group consisting of Ti, Zr, Nb and Hf.

Claim 24. (New) The method according to Claim 21, wherein said magnetic material consists essentially of:

a total of 50 to 80 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr; and

a total of 20 to 50 atomic % of one or not less than two elements selected from the group consisting of Sb, Bi, P and As.

Claim 25. (New) The method according to Claim 22, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 26. (New) The method according to Claim 23, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 27. (New) The method according to Claim 24, wherein the content of oxygen in the magnetic material is not more than 1 atomic %.

Claim 28. (New) The method according to Claim 21, wherein said magnetic material consists essentially of:

a total of 79 to 90 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 13 atomic % of one or not less than two elements selected from the group consisting of Si, C, Ge, Al, B, Ga and In; and

a total of 6 to 8 atomic % of one or not less than two elements selected from the group consisting of Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb, wherein the content of Si in the magnetic material is more than 4 atomic %.

Claim 29. (New) The method according to Claim 21, wherein a ferromagnetic/antiferromagnetic interaction occurs at said inflection point.

Claim 30. (New) The method according to Claim 21, wherein, in a graph of entropy change $\Delta S(T, \Delta H)$ versus temperature of the magnetic material which produces a peak, the effective temperature width of the peak must be 3° K or more.

Claim 31. (New) The method according to Claim 30, wherein the effective temperature width of the peak must be 5° K or more.

Claim 32. (New) The method according to Claim 21, wherein said magnetic material consists essentially of:

a total of 50 to 96 atomic % of one or not less than two elements selected from the group consisting of Fe, Co, Ni, Mn and Cr;

a total of 4 to 43 atomic % of one or not less than two elements selected from the group consisting of Si, C, Ge, Al, B, Ga and In; and

a total of 4 to 20 atomic % of one or not less than two elements selected from the group consisting of Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb, the magnetic material, at its inflection point within said temperature range, exhibiting a base width of at least 3° K of its peak of entropy change $\Delta S(T, \Delta H)$.